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Chair

Mr. Leon Benoit

Standing Committee on Natural Resources

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● (1100)

[*English*]

The Chair (Mr. Leon Benoit (Vegreville—Wainwright, CPC)): I call the meeting to order.

Good morning, everyone.

Before we get to our witnesses today, we have two orders of business to quickly complete. The first is a motion by Peter Julian that the committee invite the minister to deal with the supplementary estimates (B). We certainly agree with that. Mr. Anderson has talked to the minister. I would just propose a friendly amendment to the motion. Instead of saying "before December 4", it would say "on or before December 4". The minister probably can come on December 4. Can the committee agree to that change?

Go ahead, Mr. Julian.

Mr. Peter Julian (Burnaby—New Westminster, NDP): Thank you very much, Mr. Chair. I appreciate the agreement of the Conservatives on this matter. There are a lot of other things we could propose too, if the Conservatives are in a welcoming mood. As far as this is concerned, I think it will work out very well if it's on December 4.

The Chair: Thank you.

The second item is just the formality of passing the budget to bring witnesses to this committee and do the teleconferencing and that type of thing. The estimated budget is $31,500, as you see before you. It was sent to you last night. Is it agreed that we pass this budget to deal with the costs of the committee? Is that agreed?

Some hon. members: Agreed.

The Chair: Those items of business are complete.

We will get to the main business of the committee today, which is to continue our study on innovation in the energy sector. This is our second meeting on this matter. We had departmental officials on the first day.

Today we have with us, from the Canadian Association of Petroleum Producers, Bob Bleaney, vice-president, external relations. Welcome, sir. From the Canadian Association of Petroleum Producers, by video conference from Calgary, we have Greg Stringham, vice-president, markets and oil sands. We have Dan Wicklum, chief executive of Canada's Oil Sands Innovation Alliance. From the Petroleum Services Association of Canada we have Mark Salkeld, president and chief executive officer. We have Wally Kozak, engineer chief, global services, Calfrac Well Services Ltd. We have Mark Bentsen, president and chief executive officer, Cathedral Energy Services Ltd. By video conference, from the Pembina Institute, we have Tim Weis, director, renewable energy and efficiency policy. Welcome, Mr. Weis.

As well, by video conference from London, United Kingdom, from Climate Change Capital, we have James Cameron, chairman. Mr. Cameron, can you hear us?

Mr. James Cameron (Chaiman, Climate Change Capital): Yes, I can. Thank you very much.

The Chair: Thank you very much.

Those are our witnesses for today. We will now take the presentations of up to 10 minutes. I understand that the time will be split between Mr. Bleaney from CAPP and Dan Wicklum from Canada's Oil Sands Innovation Alliance.

You have five minutes each, or whatever it works out to. You have up to 10 minutes, starting with Mr. Bleaney. Go ahead with your presentation, please.

Mr. Bob Bleaney (Vice-President, External Relations, Canadian Association of Petroleum Producers): Good morning, Mr. Chairman and members of the committee.

My name is Bob Bleaney. I am the vice-president of external relations of the Canadian Association of Petroleum Producers, or CAPP, here in Ottawa. We represent Canada's upstream oil and gas sector, and our members find and develop about 90% of Canada's petroleum resources. Our industry is the largest private sector investor in Canada, investing over $50 billion each year and employing well over half a million Canadians.

With me today by video conference is Greg Stringham, CAPP's vice president of markets and oil sands, as well as Dan Wicklum, the CEO of COSIA. CAPP and COSIA are co-sharing this opportunity to present to you today.

It is important to develop and grow Canada's resource sector for the benefit of all Canadians, providing jobs, economic growth, and revenue to Canadian governments. Canada is advantaged by having a vast endowment of petroleum resources, ranking number three in world oil reserves with 174 billion barrels of oil, and number three in natural gas production. With this endowment, technology development and innovation remain fundamental to our industry's future.

Canada’s oil and gas resources are increasingly unconventional in nature and more difficult to develop and produce. Canadian costs are high by international standards, and we are challenged by competitiveness issues such as scale, geographic location, and the size of market. Competitiveness is key to attracting the investment capital required to continue to grow and access new international market opportunities, and we need to continuously improve on environmental and social performance. Technology and innovation must largely drive this improvement and are key to informing and grounding public policy and regulation as it applies to our sector.

Some key barriers we see are as follows. Most of our industry’s R and D takes place in large industrial environments that are not dependent upon direct federal funding. Innovation in our industry is largely in the form of improvements to existing technology, often developed through field testing to prove out research hypotheses. Improvements in technology can deliver very significant benefits in large-scale developments, but it can be challenging to fund the pilot project work and the field testing that is critical to evaluate such technology.

The most important vehicle to support this R and D has been the federal scientific research and experimental development program, or SR and ED. The recent changes to SR and ED, removing the eligibility of capital expenditures and reducing the general rates and allowances, will serve to erode capacity for innovation. Instead we should be increasing accessibility and eligibility in order to enhance the pace of innovation deployment and commercialization.

There is a need for greater collaboration and networking on the technology development side as well, both within our industry and with stakeholders, driven by the competitive nature of industry and the fragmentation of effort among industry, academia, governments, and research institutions. We are making significant improvements in some areas, as you’ll hear from my COSIA colleague, but we'll need to focus more broadly on the more specific innovation needs across Canada’s upstream petroleum sector.

Notwithstanding these challenges, our industry has delivered considerable innovation success. The oil sands industry has continuously advanced technology to improve access to Canada’s immense oil resources and to improve our production, energy efficiency, and environmental performance. Horizontal drilling and hydraulic fracturing technology to access unconventional gas, and more recently, tight oil resources, are also game changers. Our industry has been successful in applying and enhancing this breakthrough technology in Canadian applications.

To conclude, we must continue to grow Canada’s resource sector for the benefit of all Canadians, and as an industry we have made significant steps forward and are committed to innovation and performance improvement in order to ensure our global competitiveness, our access to international markets and investment capital, and our social licence to operate. We should focus support for innovation and technology development in areas where we can best leverage Canada’s competitive advantage: its vast endowment of oil and gas resources. It's through greater focus, collaboration, and more accessible SR and ED support that Canada can best lever this advantage.

I’d now like to turn the presentation over to COSIA.

● (1105)

The Chair: Thank you, Mr. Bleaney.

We now will go for a little bit over five minutes to Dan Wicklum, chief executive for Canada's Oil Sands Innovation Alliance. Go ahead please, sir, with your presentation.

Mr. Dan Wicklum (Chief Executive, Canada's Oil Sands Innovation Alliance, Canadian Association of Petroleum Producers): Thank you, and good morning. It's a great opportunity to be able to speak with you today.

I'm here to tell you about an organization called Canada’s Oil Sands Innovation Alliance, or COSIA. COSIA is an alliance of 14 oil sands producers that collectively account for about 90% of the production in Canada's oil sands.

These organizations came together on March 1, 2012, to formally launch the alliance, and at that launch the CEOs of these companies stood up very publicly on a stage here in Calgary and signed a charter. The charter was a collective and very public expression of a commitment to a vision and a commitment to a certain suite of actions and behaviours that would allow the companies to realize their vision.

The vision is to enable the responsible development of Canada's oil sands while accelerating the pace of environmental performance improvement through collaborative action and innovation. To our knowledge, there is no other organization that uses the same model, certainly not at the same scale or size that COSIA has, anywhere else in the world, so we're quite proud of it.

What makes COSIA unique? We speak in terms of “the four Ls”.

The first “L” is leadership. The oversight of COSIA and the work on our four environmental priority areas—water, land, tailings, and greenhouse gases—will include input from the chief executive officers of the companies, with support for our activities extending throughout the individual companies.

The second “L” is what we call line of sight. COSIA is not an organization simply about effort. It's an organization about effort to attain specific ends. The ends are regional environmental improvement and performance goals that we will set publicly, and we will report progress publicly against those goals.

The third “L” that makes COSIA unique is leverage. COSIA will be the collaborative hub through which environmental innovation developed by individual companies will be shared. It will enable participating companies to work together to avoid duplication of effort, to share their innovation defined from things as hard as intellectual property, such as a patent, although it could be the other end of the spectrum of things, such as best practices, research data, and monitoring data. This will be the hub through which innovation can be shared. We will work to avoid duplication of effort; leverage our collective expertise, technology, data, and best practices; and build on one another's successes to improve the pace of environmental performance improvement.

The fourth “L” is linkages. COSIA is founded on the concept of openness, and we will connect with those developing innovative solutions to environmental challenges within and outside of Canada with a view to sharing that innovation to advance performance inside our environmental priority areas. We will listen to, respond to, and work with stakeholders to address evolving needs and conditions.

The oil sands producers have made great strides in increasing the efficiency and reducing the environmental footprint of oil sands production during the first half of commercial development of this resource. Frankly, this progress was made by companies acting independently. By forming COSIA, what industry leaders have done at the highest levels is identify that when it comes to environmental performance, a collaborative model is a better way to advance innovation and accelerate the pace of environmental performance. Through COSIA, intellectual property, funding, and human resource barriers will be removed that otherwise would have impeded progress.

Canada's oil sands represent a tremendous strategic asset for this country. The companies that will realize the value of this asset for Canadians share a solid determination to make the oil sands a showcase of world-leading environmental innovation and environmental performance.

Thank you.

● (1110)

The Chair: Thank you very much for that presentation.

We go now to the Petroleum Services Association of Canada. I understand that Mark Salkeld, president and chief executive officer, will make the presentation. With him are Wally Kozak and Mark Bentsen.

Go ahead with your presentation please, Mr. Salkeld.

Mr. Mark Salkeld (President and Chief Executive Officer, Petroleum Services Association of Canada): Thank you very much.

Good day, and thank you for the opportunity to present to the committee.

My name is Mark Salkeld. As mentioned, I am the president and CEO of the Petroleum Services Association of Canada. PSAC is a national trade association representing the service, supply, and manufacturing sectors within the upstream petroleum service industry. We represent a diverse range of almost 260 member companies employing more than 65,000 employees and contracting almost exclusively to oil and gas exploration and production companies.

PSAC member companies represent over 80% of the business volume generated in the petroleum services industry. Our members cover 17 subsectors in the oil field services sector.

As mentioned, I am joined by two colleagues, Mr. Wally Kozak of Calfrac Well Services and Mr. Mark Bentsen of Cathedral Energy Services, who are experts in the fields of hydraulic fracturing and directional drilling respectively. Mr. Kozak is also chair of the Canadian Society for Unconventional Resources.

We appreciate the opportunity to speak to you today about a few of the technologies being deployed by Canada's oil and gas service industry. These very significant technologies have allowed a major resurgence in oil and gas resource development for Canada and for North America as a whole.

The oil field service sector in Canada is relatively young. It was just 60 to 70 years ago that hydrocarbon resources were discovered in significant quantities, owing to American-based producers bringing rigs and related services from the U.S. to wildcat wells in the Canadian west. Since then, the Canadian oil field services sector has evolved from steam-powered cable tool rigs to AC electric rigs controlled by programmable logic controllers and variable frequency drives. This is just in reference to the rigs.

There are now vast fleets of equipment deployed in the drilling and completion of oil and gas wells. The complexity of the wells and the drilling activity requires constant innovation, and Canada's petroleum services industry has become exceptionally specialized, which is a reflection of the technology innovation that is positioning many of our members as global leaders.

In 2009, just 36 of PSAC's Canadian-owned and Canadian-operated member companies, based in Canada and paying federal and provincial taxes, generated $12.8 billion in export revenues from energy services knowledge, technology, and manufacturing sales around the world. This is a significant factor for the increasing interest by foreign investors to tap into the technology we are developing, testing, and proving effective here, which can easily be adapted to work anywhere in the world.

Another significant underpinning of Canadian oil field innovation is the ever-increasing efforts and collaboration between the producers and the service providers. Well sites become the laboratories, and a recent report from the Standing Senate Committee on Energy, the Environment, and Natural Resources acknowledges that current measurement of R and D activity does not fully capture an estimated additional $1 billion spent annually by energy companies in their labs and in field experiments. Much of that activity is undertaken through collaborative efforts between service companies and the producers, because oil and gas wells do essentially become the testing grounds.

Earlier days saw producers spending a large amount of money on R and D internally or through academic institutions. This still occurs today, but so too do the ever-increasing efforts in R and D by PSAC member companies in their own labs and facilities as well as in the field on live wells. The technology behind the ever-increasing accuracy and real-time downhole data being provided to our customers is also supported through seismic data, an example of which is that when these two data sources—seismic and downhole readings—are combined and processed by geologists and petroleum engineers through computer simulation, you have a service that is as close to leading edge as you can get.

For instance, I am aware of at least five big screens housed by producers and PSAC member companies in their Calgary offices. Imagine a theatre-style arrangement where producers and PSAC member companies can witness three-dimensional and holographic imaging as technicians don special gear that allows them to virtually walk through a customer's formation 3,000 metres below the surface of the earth and position the drilling tools in the most optimal position for maximum production.

● (1115)

Once the well is designed, the drill bit can be steered from downtown Calgary offices by highly trained people skilled at directional drilling, with real-time downhole data communicated live to and from the rig in, for example, northeastern British Columbia. Directional drilling technology, in conjunction with other service technologies, continues to expand at a fast pace. The continuous buildup of computing power on downhole directional tools, as well as the expansion of sensor packages, is allowing us to develop real-time pictures of what is going on downhole.

The technology being provided to our customers today has significantly lowered surface environmental impact while increasing subsurface exposure to producing formations. The well site today can be home to multiple wells, drilled in relatively close proximity on surface, while reaching ever-increasing areas below the ground. The technology implemented to steer the bit into the optimal position, in conjunction with vastly improved real-time data readouts from downhole and seismicity recordings, allows for extremely accurate hydraulic fracturing stimulation and tracking in predetermined stages.

A third technological advancement I would like to point out today is with regard to wellbore integrity. The wells we are delivering to our customers today are thousands of meters below the surface, under layers of solid rock. Canadian service companies that cement these wells, like every other aspect of our industry, are highly regulated to standards that are—

[*Technical difficulty—Editor*]

● (1120)

The Chair: We've lost you for the—

Mr. Peter Julian: Our technology is obviously not as good.

The Chair: Yes.

We've lost you, Mr. Salkeld, for the time being. We'll see if we can get you back online.

We've also lost Mr. Weis from the Pembina Institute, so I think we'll go to Mr. Cameron for now.

If you're ready, Mr. Cameron, we'll go to you for up to 10 minutes for your presentation from London, United Kingdom, from Climate Change Capital, on innovation in the energy sector. Please go ahead with your presentation for up to 10 minutes.

We have lost your sound too, so we'll have to wait and try to get that fixed.

Could you turn your microphone on, please?

Mr. James Cameron: How about that? Is that better?

The Chair: That's great.

Mr. James Cameron: Okay.

The Chair: You're on now. Go ahead, please.

Mr. James Cameron: Thank you very much, and thank you very much for inviting me to speak to your committee today.

My name is James Cameron, and I am the founder and chairman of an enterprise called Climate Change Capital. We are an asset management and advisory business focused on the climate change issue. We are now owned by a very large agribusiness, listed in New York, called Bunge, a Fortune 130 business that's a very substantial player in global commodity markets.

One of the things I do in my work is that I am part of the U.K. Prime Minister's Business Advisory Group, and my evidence to you today will be in some way couched in terms that would be similar to the advice I give that group. I want to make it plain that I am not a technologist, so I'm not in the position to give you good advice on this or that technology by way of comparison for your work, but I have seven points for you that I can make briefly, which I think you would find of assistance.

The first is that it's imperative to think of this problem as a system problem, not merely as a generation problem. The energy system needs to be thought of as a whole, and we get into trouble when we break it up into bits. Too much of our debate turns around one form of generation versus another. We don't think nearly enough about how the system could be defined, really quite radically, by the requirements of products that can be engineered in such a way that they have far less demand for power.

It's vital that in your thinking, even if it's just organizational, you look at generation. Please don't look at it separately from demand-side management, but don't even think of it in those traditional terms. If you think through how an intelligent grid might operate, why goods might be designed in order to meet tough energy efficiency standards, the energy service delivered to customers and citizens can be thought of in a very distinct way, rather than merely lining up alternatives for power generation. That's my first point, the absolute imperative of system thinking.

The second absolute imperative is that of climate change and the need to mitigate greenhouse gas emissions. Because that's an absolute priority and because it's extremely hard to do, it's important that you have means of measuring performance along the way to what are very difficult targets. It's important that in the innovation strategies you develop, you leave scope for things that we do not know today that will help us manage risks that we still don't fully understand. That level of uncertainty requires great care not to build into energy systems those technologies that ultimately will cause more economic and indeed social harm than the good they might deliver in the short term.

The third thing is to think in terms of the various devices any society has to encourage innovation and entrepreneurship independently of the energy sector. If a society can create companies easily, can shut down businesses that are ineffective, can register intellectual property with ease, can take advantage of a highly educated and skilled workforce, the chances are that there will be an innovative response to issues of major concern and importance.

It may well be that for many years we have taken energy for granted. We've been through a period of decades now in which energy has been relatively inexpensive, and huge advances have been made in the way we deliver energy to customers. I think a lot of customers have underestimated the technological input into providing that service. There is probably some public education required there to elevate the importance of energy and energy systems. On the other hand, people always feel the cost of energy when there is a small change in its price. My sense is that there is a huge capacity to innovate around energy.

However, one of the other aspects of a successful economy—innovating on any subject—is that it's a competitive economy, meaning that you have to have strict adherence to rules of competition and antitrust and you have to create space for new entrants. Many energy systems tend to get ossified around incumbents. It's extremely hard to move people who have been making investments for a long period of time and have great strength in the marketplace. It's very hard for new entrants to make their way, particularly if they have a disruptive technology.

● (1125)

One of the attributes of a successful, innovative energy system is that there is space for disruptive technologies to enter, and incumbents should be made very aware that they are at risk of losing their powerful position if a better, cheaper, more attractive technology makes its way into the energy mix.

The fourth point is that it's imperative to make a plan. There is a real opportunity to combine public policy initiatives that the market responds well to. Procurement can be a very useful strategy for organizing an innovative response, because you have a kind of volumetric demand that you can respond to. You know that there will be scope for your technology to enter a marketplace. It takes courage and it takes a decision that a government might find awkward to make, especially in the face of an incumbent, if we have a procurement strategy for certain megawatts of renewable energy, for example, we know has an effect on innovation. People can invest into that space.

Equally, we know that price signals work. Whether it's a price signal for carbon or a price signal for water, we know that those constraints, those strategies, allied to an opportunity to make money from delivering public policy, will work. Entrepreneurs rush to the opportunity to create value from delivering public policy.

The fifth point is that there is a huge reward in resource efficiency and energy conversion. In fact, if you look at the climate change problem in the same space as the energy problem, it's largely about conversion from primary energy into usable energy. That is a fantastic investment universe. It's a place where large amounts of capital can be deployed. It's not a small sandpit for environmentalists to play in; it's something that is extremely attractive to large-scale investors of all types.

However, it is a marketplace where there is considerable risk, so again, the availability of clear standards for products, for pricing mechanisms to reward delivery of public policy, and for competitive strategies that value resource efficiency as much as they value resource exploitation—that's the way for any economy to compete in the longer term, even if they are resource-rich. That provides opportunity for capital to flow into energy conversion.

The sixth point is just one from our own business. We have a private equity clean technology fund, which is largely focused on energy, water, and to some extent waste. Most of those investments are in small private entities in Europe that are growing, perhaps in the periphery of this energy world that you're looking at. They're in energy storage, in LED lighting, in solar PV manufacturing, in silicon waste from the solar energy. We're using that waste in order to improve the life-cycle efficiency of solar PV energy.

These investments tend to be in the bracket of €8 million to €20 million, and they're going into markets that are experiencing quite significant growth even after a very tricky last three-year period for all types of investments. The scale of opportunity for those kinds of investments remains very large. They are largely fuelled by risk-takers in the investment and entrepreneurial world. Private equity has had a difficult time in the last few years, but there is no prospect of growing an innovative economy without access to risk capital.

My final and seventh point, which really links back to the first and is a way of making sure that policy, finance, and technology are in close collaboration, is with regard to data. We have a huge capacity to create, manage, store, and distribute data. That system needs to be tuned to the needs of economies to provide energy in larger amounts to larger quantities of people.

Data systems that provide real-time information to allow large-scale consumers as well as individuals to manage their energy needs will have a profound effect on the systems we use in the future. We are very close to building big open data systems that will, I think, make a profound difference to the relationship between supply and demand in the energy system.

Put simply, with open data systems and with good data management, pretty much anybody can be a producer of energy. Pretty much anybody can play a part in the successful management of energy demand. Therefore, we have to build a system that enables many, many participants to build a more robust, stable, and secure energy system quite different from the one where there are a few large-scale suppliers in a push-power system where consumers are largely receiving passively.

That's a system that requires a lot of data, but we have the capacity to provide it.

● (1130)

Thank you.

The Chair: Thank you very much, Mr. Cameron, chairman of Climate Change Capital.

We'll go back now to Mr. Salkeld.

We'll complete your presentation, Mr. Salkeld. I apologize for the interruption. Technology is wonderful sometimes, and sometimes not quite as wonderful. Could you go ahead and proceed with your presentation, please?

Mr. Mark Salkeld: Thank you very much.

A third technological advancement I would like to point out today is with regard to wellbore integrity. The wells we are delivering to our customers today are thousands of meters below the surface of the earth, under layers of solid rock.

Like every other aspect of our industry, Canadian service companies that cement the wells are highly regulated to standards that are unquestionably world-leading. I am aware of at least two types of cement simulators used for pre-job planning. The software used closely simulates the events of a cementing job and, in particular, can calculate anticipated pumping pressures, pressures at the bottom or zone of interest, and casing burst and collapse pressure.

Simulators include sophisticated animation features that show the cementing job from beginning to end. The simulator works so well that on a recent deep intermediate cement job performed by one of our member companies, the actual recorded surface pump pressures seen on the job were almost identical to those predicted by the simulation.

There is a significant effort on the part of all PSAC members across the 17 subsectors they represent to adapt and implement the latest technology when it meets economic, competitive, and customer requirements. The technology being applied today has made significant advances not only for the protection of the environment but also for safe and efficient extraction of natural resources. The wells being drilled today are predominantly horizontal. PSAC has forecast that 70% of the 11,400 wells to be drilled in 2013 will be horizontal, and they are reaching unprecedented lengths.

Wells are taking longer to drill and are becoming far more complex. New technology is extending the typical season, because we are constructing permanent roads and locations that allow for activity well into the traditional breakup periods, the time when equipment moves out of field because ground conditions must either thaw or freeze up.

When heavy equipment is on location longer, it saves wear and tear on roads and local infrastructure, allowing for longer working periods, which boils down to steady work, consistent crews, employment security, and income security for the multitude of businesses reliant on oil and gas activity throughout the year, such as hotels, restaurants, and grocery stores. It is PSAC member companies that are established in communities throughout Canada —predominantly in the west—that contribute to local economies by way of school and sports team sponsorships, local businesses, and the improved quality of life.

Thank you very much.

The Chair: Thank you for your presentation, Mr. Salkeld, from the Petroleum Services Association of Canada.

For the final presentation today, we have Tim Weis, director of renewable energy and efficiency policy at the Pembina Institute.

Please go ahead with your presentation, Mr. Weis.

● (1135)

Dr. Tim Weis (Director, Renewable Energy and Efficiency Policy, Pembina Institute): Thanks for having me on. I appreciate the invitation to be here today.

I'm just going to quickly introduce the Pembina Institute so that you know who I am and the point of view I'm representing. We're a non-profit sustainable energy think tank. We're a non-partisan and independent group, and we focus specifically on sustainable energy development in Canada and how to reduce the impact of energy use on the environment and our ultimate well-being.

We were formed in Alberta, but we have offices across Canada, including in British Columbia, Ontario, and the Northwest Territories. The areas we focus on are climate change, renewable energy and energy efficiency, transportation, and oil sands development.

One of the things that is perhaps unique about how we work as a non-profit organization is that we're a hybrid organization that also does fee-for-service consulting at the same time. Many of our clients are actually companies in oil and gas development in Canada.

One of the things that perhaps makes our organization a bit unique is that we also do project work, and we work with communities, in particular on developing clean energy projects, so we have some experience on the ground.

That's an introduction to the institute and the background that I'm coming from.

What I want to specifically talk about today is renewable electricity. With the list of things that the committee is looking at, we could spend all day talking about these issues, but I want specifically to talk about renewable electricity, and then a specific subset within that.

We're seeing huge growth rates in renewable electricity. We've seen sustained growth rates of 30% per year in development around the world. Even right through the global recession, these types of growth rates continued. We're also starting to see countries targeting 100% renewable energy within our lifetime and within current investment decision timeframes. Scotland, for example, is targeting 100% renewable energy by 2020, Denmark by 2035, and Germany by 2040 or so. What that means is that decisions need to be made today in order to be able to achieve those targets.

This government has set an admirable goal, in my opinion, of achieving 90% of our electricity from non-emitting sources by the year 2020. That would put us on a good track. At this juncture, however, we're not on track to meet that target.

When it comes to renewable energy, especially renewable energy innovation, a question we often ask ourselves is how we rank against other jurisdictions, particularly other industrial countries. There are all sorts of reports out about this, and generally they conclude the same thing: that within our industrial peers, we're roughly in the middle of the pack when it comes to clean energy innovation and clean energy investment—by and large not a leader, but also not a laggard.

Canada all too often undersells the size of the country and undersells our importance in the world. Canada has the sixth-largest electricity system on the entire planet. We also have a huge opportunity to export to the United States. Our domestic electricity supply is the same as Germany's. I think all too often we undersell ourselves and think of ourselves as a small player; we're not.

That said, Canada generally also ranks within the top ten renewable energy developments globally, so we do have a significant market that is also creating jobs in Canada on the renewable energy side. One of the struggles, especially when it comes to innovation and investment, is that we have 13 different jurisdictions in Canada that energy companies have to deal with, and it's difficult to develop renewable energy in a coordinated way because we have ten provinces and three territories that have jurisdiction in this area.

One area the federal government could provide leadership in would be carbon pricing, which would help to create a stable market or a stable climate across the country.

I want to focus on one particular area. There are so many things I could talk about today, but there is one area that always gets forgotten. It's a very small subset that I want to talk about: remote communities in Canada, and the opportunity for renewable energy in remote communities.

We have over 300 remote communities in Canada, many of which rely on diesel power. Their fuel cost can be three or four times the price of heating fuel that you and I pay, and electricity prices can be up to ten times the price that you and I would pay.

● (1140)

There is significant difficulty getting diesel into these remote communities. It also represents money that is continually leaving those communities, which is a challenge to their long-term economic development.

What is particularly interesting about this area is that at one point in time, Canada really was a leader in developing renewable energy technologies for off-grid communities. Hydro Quebec was one of the early researchers in the area, and NRCan played a very important role in the early research that went on. There was leading research that went on in Prince Edward Island. There were early projects in northern Ontario, northern Quebec, and the Northwest Territories, and more recently in Newfoundland and Labrador.

Unfortunately, however, we have lost this lead and have lost it quickly, largely because we haven't been continuing with these types of investments and haven't been continuing to support this type of technology in Canada's remote communities. Australia and Alaska have really taken over the lead. In many cases, they have actually reverse-engineered Canadian technology.

Obviously it is important that those individual remote communities get renewable energy, but I think remote communities also offer unique innovation opportunities for renewable energy more broadly, not only in southern Canada but also around the world.

There are innovation opportunities within the technology itself. Obviously, operating in cold climates under unique operating conditions is difficult and requires new ways of thinking. There's also important innovation that needs to happen when it comes to integration of these technologies. For example, there are now wind energy projects operating in Antarctica that can operate at 60% wind energy, on average, so throughout the year, over half of their power is coming from the wind. What that means is that there are many times throughout the year when 100% of the power is being delivered by the wind.

These are engineering feats that I think were unheard of or were thought impossible at one time, but they are being done even in environments as harsh as Antarctica and Alaska.

Another important area remote communities offer, from a technological innovation standpoint, is the opportunity to innovate on power storage. There are opportunities in short-term storage, such as flywheels that help to integrate some of the ups and downs of renewable energy development. There is also long-term storage, such as batteries or pumped-in hydro. I think there are important areas remote communities offer to the rest of the country or the rest of the world.

As I said, we don't have to look any further than Alaska, which currently has over 20 off-grid wind-diesel systems operating. They are operating in harsh climates. They are operating, in many cases, out on remote islands. If Alaska is doing it on this scale, there is no reason we can't be doing it here in Canada on that same scale.

With respect to remote communities, one other important point is that this is a federal jurisdiction. It is important for the federal government to play a leading role here, not only because it is a federal jurisdiction but to provide that coordinated approach across all the different provinces and territories that have remote communities that currently rely on diesel and are looking for more sustainable opportunities.

This would provide an important area for Canadian expertise to regain the leadership we once had. I think we need to be cognizant of the point I made earlier, which is that we have a sizable domestic market here where we can prove this technology out. We can make important innovations. There is really a massive global opportunity to be exporting this type of power. There are all sorts of islands around the world that are off-grid. There are many communities that are rural electrification opportunities.

There are also mines. Mining operations are a key area. As an example of what is being done in this country, the Diavik mine recently put up wind turbines in the Northwest Territories.

I would like to sum up by suggesting that this is one key area, albeit a small area, that Canada all too often forgets about, and it is an important area. We can be renewable energy leaders and innovators.

Thank you.

The Chair: Thank you for your presentation, Mr. Weis. Mr. Weis is a renewable energy and efficiency policy director from the Pembina Institute.

So far in this study on innovation in the energy sector, we've heard from the Department of Natural Resources. That was at our first meeting. Now we're getting a good overview from many in the innovation business in the energy sector today. We will expand on that through questions and comments from members.

We will start with Mr. Allen, for up to seven minutes.

Go ahead, please, sir.

● (1145)

Mr. Mike Allen (Tobique—Mactaquac, CPC): Thank you very much, Mr. Chair.

Thank you to all our witnesses for being here.

I'd like to start at a bit higher level with the folks from the Canadian Association of Petroleum Services and the Canadian Association of Petroleum Producers. I'd like to understand where we are on the timeline on the innovation right now.

To the services folks, you talked about holographic imaging, you talked about directional drilling, you talked about wellbore integrity. There was an interesting statistic. In 70% of the 11,400 bores, there's going to be horizontal drilling, which I found quite interesting.

I'd like to start, generally, at a high level as the first question. You've given some examples, and I'd ask CAPP to do the same thing. Over the last five years, what have been some of the major technological innovations? Then take me five years out. I would like to go 10 years, but I don't think anybody could speculate on that right now. What would you see as the most promising technologies, in your view right now, for the next five years?

Mr. Bob Bleaney: I agree. Trying to go more than five years out may be a challenge. That's a thing we don't yet know.

In terms of specifics around examples in our sector, in the CAPP area, I will deflect this question to Greg Stringham. He's very close to some of the technological advances that have been made within CAPP's group.

The Chair: Mr. Stringham, go ahead, please.

Mr. Greg Stringham (Vice-President, Markets and Oil Sands, Canadian Association of Petroleum Producers): Thank you. I'll take the opportunity to comment on it.

Over the last five years, from the oil and gas sector, some of the major innovations have been both on the recovery and on the environmental side of things. Let me start with a few of them, just to give you examples.

For example, to both reduce the amount of energy going in and thus have an impact on greenhouse gas emissions and also to increase recoveries in the whole area of drillable oil sands—or what we call the in situ—there has been a massive change from using just heat in the past, or just steam going underground, to putting some light hydrocarbons in with that steam, light propanes and butanes.

That actually increases recovery, but it also then reduces the amount of steam that's needed, which of course then generates back to less gas being used to generate that steam. It not only increases the economics but also reduces the environmental footprint by having less greenhouse gas. That's been a really major thrust, I would say, over the last three years, and it's not yet mature. It's still being developed very strongly.

Another one, probably over the last three years, as well, in that same area—and then I'll broaden out to some of the other ones—is what we call infill drilling in the oil sands. If you're putting two horizontal wells down to warm up the ground underneath, there's this little space between those two that actually gets warmed up, but you can't get the oil out of it.

Many companies, over the last three to five years, have been drilling—what they call infill drilling—a well right down the middle of the two. There, you don't have to put in any steam, because you've already warmed the underground resource, so you're getting oil out of the oil sands without any additional steam or heat at all. Of course, that really helps the overall project with its recoveries, but it also reduces the environmental footprint on a greenhouse gas basis.

Those are just a couple of examples.

A third one I would give from across the whole sector, as mentioned earlier, is the concept of cogeneration. If we're going to need steam anyway to develop the oil on the oil sands, then companies have been very strong at putting in cogeneration. They're using the heat from the natural gas they're burning more than once, and they're using cogeneration to generate electricity to put on the grid. As you well know, here in Alberta we still have a significant amount of coal on our grid as well, so it helps supplement that by at least burning natural gas for the grid and then using the steam that comes out of the back end of that to go underground to warm up the oil and get the oil out.

I'll look out five years on that to some examples that are really just starting now, then I'll ask the services companies to talk about some of the things there.

One of the real keys is looking at things like waterless recoveries. Can we actually get into the extraction of this oil and gas without using water at all? Again, it's very leading-edge. It's at a bench scale, at a test tube and beaker scale right now. As you know, in our industry it's always hard to make the jump from that scale up to the commercialization scale. That's where some of the things are being looked at over the next five years. Waterless recovery is a big one that's going on.

Again, we're already using an awful lot of solar power in the conventional oil and gas business because we have these remote facilities, as was mentioned by Pembina—the remote towns. We have remote facilities everywhere. We're actually one of the largest users of solar panels throughout western Canada, because we need power at our remote well sites. That's another area that's being developed heavily by our industry. They're not connected to the grid. As we go more and more into the unconventional tight oil, tight gas, and shale gas areas, we are going to be in remote locations.

There are some examples to get started with. I'll turn the time over to the petroleum services group.

● (1150)

Mr. Wally Kozak (Engineer Chief, Global Services, Calfrac Well Services Ltd., Petroleum Services Association of Canada): I'll speak for my subsector, which is pumping services and stimulation. Mark said there were 17 subsectors, and we're just one of them.

The Chair: You're Mr. Kozak, is that correct?

Mr. Wally Kozak: I am, yes.

The Chair: Okay, good. I just wanted to make sure we identified you.

Go ahead, please.

Mr. Wally Kozak: One of the innovations that's going on very actively today is the reduction of regulated, or WHMIS-controlled, materials in our chemicals. There are ongoing efforts to minimize what are seen to be regulated materials that appear on MSDS sheets.

We are also improving our fluid systems' capabilities of using non-potable water. We recognize that fresh water is a precious and costly resource, and we're doing everything we can to maximize our use of other sources of water so as not to compete with others for that resource.

The nature of our industry has changed. Our equipment used to travel on the roads for 8 to 10 hours a day, show up at a customer's location, and perform services for two hours. The world has turned around. Our equipment goes down the road and it may remain on a customer's well pad for weeks, if not a couple of months, at a time, so we are reconfiguring our equipment to become transportable, rather than simply portable. This equipment would require fewer returns to base for maintenance and repair. We're also trying to reduce our impact on roads and improve our productivity.

Another example is fuelling. With equipment remaining on a site for weeks at a time, we are hauling diesel fuel to that equipment. We are exploring other fuelling sources for that equipment and trying to reduce the impacts and hazards associated with transporting the fuel.

I hope that—

The Chair: Thank you very much.

Thank you, Mr. Allen, for your questions. You may get a chance to answer some questions later.

Mr. Julian is next.

Mr. Peter Julian: My thanks to all our presenters today. It's hard to know where to start. We have a lot of good information that's been put on the table, so thank you for being here.

Mr. Cameron and Mr. Weis, first, with respect to climate change and mitigating greenhouse gas emissions, do you not feel it's important for all governments to take climate change seriously? Of course, that's a debate in the Canadian Parliament. We feel the government isn't taking it seriously. The government feels that they can make up stuff about the opposition rather than addressing what is a serious concern. Do you not feel it's important for governments to take action on this issue?

Second, there's the whole issue of the green energy market. You touched on it, Mr. Cameron, when you talked about the clean technology funds. Mr. Weis, you've touched on it as well. To what extent is Canada missing out? We have a substantial hydroelectric sector, but in wind power, we're behind our major competitors, and in other sectors, such as geothermal, tidal, and solar, we're non-existent. To what extent is the international market going to evolve from now till 2020, and what are the opportunities Canada is missing if we don't have in place an innovation agenda that includes a green energy sector and all of these new technologies?

Mr. James Cameron: Your first question provides me with an opportunity to say something I think is blindingly obvious, namely, that all governments everywhere must make climate change a priority issue, even if it's difficult to do in times of economic hardship, even if it requires cooperation with other governments that might be hard to manage, and even if there's little feedback on progress in the lifetime of a Parliament or a politician or a CEO of a large company.

This problem is large. It appears intractable. It's frustrating. You can hardly feel any reward for making progress in it, but it defines what government is for. It doesn't make any difference what a government's politics is: climate change has nothing to do with left or right. How you respond to it does, but understanding the issue does not.

I've been working on this for over 20 years, and I remember vividly the United Nations General Assembly on Global Environment in November 1989, when Margaret Thatcher said that climate change science is so clear, the need to act so obvious, that we shouldn't be squabbling over who pays for it.

● (1155)

Mr. Peter Julian: Sorry, Mr. Cameron, it's just that we have limited time, so could you answer the second question around the green energy sectors?

Mr. James Cameron: I think the best way to figure it out is to have a look at how the marketplaces in growing economies are forming around resource efficiency and clean energy. This is not an either/or strategy. There's still plenty of opportunity to sell fossil fuels for a generation, but if you look at China's five-year plan, it makes it very plain that they want to grow their economy on a more resource-efficient basis. They have told you very clearly what technologies they are looking for. The five or six sectors they have picked up to grow are dominated by environmental technologies.

Their targets for energy efficiencies are demanding, severe, and difficult to implement, but already they are creating the largest renewable energy market in the world. They are bound to create the largest resource efficiency market in the world, just because of the sheer necessity of delivering demand to 1.4 billion people in a way that doesn't damage their economic growth prospects.

So I think if you take China—

Mr. Peter Julian: Thank you, Mr. Cameron. I'll move on to Mr. Weis. Thank you very much.

Mr. James Cameron: It's a pleasure.

The Chair: Mr. Weis is next, please.

Dr. Tim Weis: Thanks for the question. I appreciate the question. I think I can answer the two questions at the same time.

Yes, obviously, we need all levels of government to be involved, but I think there is a particularly important role for the federal government because, as I suggested in my presentation, one of the struggles of the clean energy sector in Canada is that we have 10 different markets, or 13 if you include the territories. It is difficult for companies investing in wind or solar or these other emerging technologies to navigate that.

I think what we do need are federal targets, we do need federal programs, and I think carbon pricing is probably the one place to start. It certainly isn't the only area that we could be investing in, but I think we need that federal leadership, which then helps to broaden that playing field for investment.

The one thing I do want to point out, though, is that although Canada has actually not done too badly when it comes to renewable energy, we are at risk of not seeing that industry through. There's been a fair bit of development. We're in the top 10 in wind energy. We're getting there in solar energy, but we're looking at a cliff in the next few years.

Are we going to continue that development? Are we going to be able to coordinate that and grow those industries, or is it ultimately going to be a boom-and-bust cycle in the country? I think that's where decisions need to be made in the next few years to make sure that the gains we've made, the employment we've created, and the capacity we've developed stay in Canada and ultimately become a strong export opportunity for us.

Mr. Peter Julian: Mr. Weis, what are the initiatives that the federal government needs to put in place so that we don't go over that cliff that you've mentioned so eloquently?

Dr. Tim Weis: There are three things we could be doing in the short term. One, and I'm harping on it again, is some sort of carbon price or some sort of signal that there will be a price on carbon. I don't think anyone.... Most people won't argue about that being probably the best place to start.

The other two areas—

Mr. Peter Julian: There are only 167 Canadians who would argue with you, and they sit on the other side of the House of Commons.

Dr. Tim Weis: The other two areas that I think are key opportunities, at least in the short term, would be around investments and power storage.

This is going to be an exciting area for development. Canada actually stands in an interesting place, because we do have some difficulties in integrating not only renewables but also traditional sources. We're having problems with too much nuclear in Ontario, for example, so having the capacity to store power would be an important area. I think that could be a key area for the government to leverage in the way that the government has helped push things like wind energy forward in the past.

The last area is again a small area, but I think it does have some of those key innovative opportunities. I spoke of largely about it in my presentation, and that's recognizing our remote and northern communities. They all too often just get left out of these discussions and forgotten about.

● (1200)

The Chair: Thank you very much, Mr. Weis. Thank you, Mr. Julian.

We'll go now to Mr. McGuinty for up to seven minutes.

Mr. David McGuinty (Ottawa South, Lib.): Thank you very much, Mr. Chair. Thank you to all of the witnesses who are here in person and coming in by video and audio.

Mr. Cameron, it's really good to see you again.

Mr. Chair, Mr. Cameron is far too modest in his presentation. He is one of Britain's top barristers, a distinguished professor at the University of London, and a senior partner in a number of very major international law firms. He is a very accomplished individual, so I wanted to make sure everyone understood how delighted I am to have him here testifying today.

Mr. Cameron, I will go back to a couple of your comments. You were just getting into full flight, so to speak, with the situation in China and where the Chinese were going. It raises a question I think most Canadians don't really know the answer to, if there is an answer: what are we talking about when we talk about a clean economy?

Could you help us understand what that means? As well, is there a race on internationally to become the cleanest economy, and what's that race all about?

Mr. James Cameron: Well, it's nice to see you again, David, too.

I feel the starting point for this is to do with competitiveness. Much of our debate on competitiveness is being based around the idea that labour productivity, the standard definitions of competitiveness between nations, do not include resource depletion, environmental externalities, investments in the future. They're largely static and backward-looking.

My own view is that economies, wherever they are in the world, will compete on resource efficiency. The numbers really tell you that. There are spectacular needs for a very large group of humanity that is yet to be born. The growth in our population, the aspirations of the middle class of the emerging economies, the phenomenal growth in the emerging economies over the last ten years.... Simply think of China alone. China has grown tenfold in 15 years. China's produced three new Chinas, in economic terms, in the last three years. Similar demographics are available in India.

A clean economy, I think, is almost synonymous with a resource-efficient economy. There are certain quality of life aspects, certain qualitative ways of reviewing what clean means—human well-being, how you live in harmony with your surroundings—but at base, in brute economic terms, it's about resource efficiency. It's about how you get economic output from more efficient use of inputs, particularly energy inputs. To do that, you have to innovate. Business as usual, the current resources, won't do that for you. The current modes of business won't do that for you.

If you look around the world, you see that the race has absolutely begun. It has begun in those economies that are either very populous or those economies that expect huge demands that they cannot meet from indigenous resources. It clearly involves open trade systems as well. It involves business entrepreneurship and connecting communities across political divides too.

A lot of this can be done without the intervention of governments, through better social organization of entrepreneurs and problem-solvers who can now communicate so much more clearly on social networks.

Mr. David McGuinty: If we take your seventh point this morning —

Mr. James Cameron: Yes.

Mr. David McGuinty: —when you said that policy, finance, and technology must be in close collaboration, can you help us understand comparatively...? What examples would you look to as the most innovative on the policy front? Perhaps you could particularly focus on fiscal measures. What are the Germans doing, for example? What are other jurisdictions doing that would help us to get that policy-setting right?

Mr. James Cameron: I think there are three things. I'll try to go through them as briefly as possible.

One, there is still some scope for procurement. Saying very clearly what you want produces a market response. Investors and entrepreneurs want to know a market space they can pitch into, particularly if it's a highly regulated sector where the incumbents are very strong. You can do it a dozen different ways. You can do it with feed-in tariffs, you can do it with renewable energy targets, you can do it with energy storage requirements, but being clear about what you want really helps as a market signal.

Please bear in mind, and this is true across the world, that when businesses say they want certainty, they don't really mean it. What they really want is to win competitively. When they say they want a stable regime, that's true, they do, but they want it in order to be successful as individuals.

Regulation can be extremely creative. Investors and entrepreneurs can respond very clearly around being told what to do, but it's not enough, so you have to have a market response. Use taxes. Use a reward for delivering an outcome against an unpopular tax. It could be a property tax, it could be a capital gains tax. Take that away in return for a reward. Have a price signal that's measurable against performance from a tax. Have a market mechanism that allows entrepreneurs to work around—like a price for carbon—in a trading system. It doesn't have to be the same one as the Europeans have tried and experimented with, although we've learned a lot from that, but have some kind of market mechanism for carbon. That itself is not enough for innovation. You need some other strategies to build capacity, including supply chain capacity, to sell into markets. Carbon pricing will help, but it won't do it on its own.

The final point has to do with information itself. Have a strategy on information. Make information as available as possible, as open-source as possible, through open government but also through our amazing ability to communicate now on networks.

● (1205)

Mr. David McGuinty: Mr. Cameron, for my last 45 seconds, would you talk again about the importance of making sure your energy policy is fully integrated with your climate policy, and maybe also illustrate with what's going on elsewhere?

Mr. James Cameron: The first thing is that there are so many things that have to be combined. I don't want to have a conversation about renewables versus gas. These technologies need to be combined. We need a tremendous amount of energy supply. A lot of our debates are trivial.

We need to have a variety in our system, to build a system that has multiple nodes and a wide range of supply, where demand is managed in real time.

There are examples of systems being developed around the world, and not only in places like Germany: you see it very often in the emerging economies. Brazil and China are running big experiments at the city level, which also include giving more autonomy to mayors to run their cities in a way that is more sustainable. That's a manageable unit, and I know that takes place in North America too.

Ultimately what you want is devices that will reward the delivery of public policy and allow energy conservation. You want a variety of energy supply to produce a more robust energy system while delivering emission reductions. That is perfectly possible. It's not insurmountable. They're not opposing objectives, and we have all the technologies we need right now to begin that process. They're just not very well combined in any part of the world. There are good examples at the city level, but there are very few examples at the national level that you could point to as a wholly successful system.

The Chair: Thank you, Mr. Cameron and Mr. McGuinty.

We'll go now to Mr. Calkins for up to five minutes. Go ahead, please.

Mr. Blaine Calkins (Wetaskiwin, CPC): Thank you, Chair.

Thank you to our witnesses for being here today.

As an Albertan, I'll preface my remarks by saying it has been a long time since I've been employed in the oil and gas sector directly. Albertans love their clean open spaces. We love our rivers. We love our lakes. We love our forests. I've seen many fantastic things in Alberta's landscape from the floor of a drilling rig and from the floor of a service rig in my employment. I've been amazed since the nineties, when I was working out in the patch, about all the remarkable changes that have happened to date.

I do want to explore some of these questions with CAPP or with PSAC. When it comes to investments and your partnerships with academic institutions, whatever the case might be, how do you go about those partnerships? I know that your organization is coming together, and it sounds as if there is some harmonization or some cooperation in exploring technological developments that will further enhance everybody's outcomes, whether it's through the environment or whether it's through production outcomes. What's the primary motivator there? Is it a social push from the population at large, or is it a regulatory push from provincial and federal governments? Where is your push coming from, and how are you meeting those demands and challenges?

My second question will be this. When you have a private sector, there are a lot of entrepreneurs. There are several in my riding that have unique and innovative ways of extracting either oil or bitumen, without using SAGD or toe-to-heel air injection. They've got different technologies and they're looking for doors to knock upon. How do you guys accommodate those kinds of entrepreneurs and take a look at their technology and see if it's worthwhile pursuing tests and trials to make sure we get the best technology possible doing the job?

● (1210)

The Chair: Do you want to start with Mr. Wicklum, Mr. Calkins?

Mr. Blaine Calkins: It doesn't matter—someone from either of those organizations.

The Chair: Go ahead, Mr. Wicklum, please.

Mr. Dan Wicklum: I'd be happy to. Thank you.

There are three questions, as I understand it. First of all, where does the push come from to launch an organization like COSIA? Then, how are we going to address challenges in the future? Third, is there a mechanism whereby garage entrepreneurs or people in your riding could mesh into COSIA?

First of all, in terms of the push, we think of COSIA as the right idea at the right time. There's absolutely no question that there is a continuous expectation from the general public for all sectors—not just petroleum, not just natural resources, and not just oil sands, but all sectors—to continuously improve their environmental performance. Good companies and good sectors listen to that.

However, I think there's actually an artificial distinction between the public and the people who run and work for these oil sands companies. Every single person who works for an oil sands company is a member of the public and every single one of them wants to be on the right side of the equation and work for an organization that develops things responsibly. I think it's an artificial dichotomy, and frankly, there's an aligned view that just getting better and better and better on environmental performance is the right thing to do. That's why COSIA was launched. It's the right idea at the right time.

How will we actually address some of these issues? There's not lack of effort in terms of innovation and R and D. We have a very significant level in Canada and in Alberta. What we feel that we can bring initially to an organization like COSIA is a focus of effort toward specific ends. Let me give you an example of how some of that focus has come into play.

As you know well, there are two main ways of extracting oil sands. One is from a surface mine, where the deposits are very close to the surface, and the other is when they're deeper or too deep to mine. In that case they are in situ; you pump steam down and essentially melt the bitumen and then pump oil to the surface.

The mining companies got together about 18 months ago, all the COSIA mining companies, and partnered with the Province of Alberta through their innovation entities and with the Government of Canada through NRCan. They did a very comprehensive solicitation of any organization or institution that had an idea about how to produce fewer tailings or how to deal with legacy tailings in the landscape, and we have produced what we're calling a road map. We synthesized well over 500 discrete ideas that came into the road-mapping process into nine types of sub-road maps. We have nine working groups now that are dedicated to exploring specific opportunities in each of those nine road-mapping areas and launching new projects where necessary in order to advance those ideas.

In terms of a broader way for individuals or companies to mesh into COSIA, we recognized from the start that in order to do the best possible job we could as an organization, we had to look outward, not just inward. We had to look past the companies themselves into academia, into governments, into smaller companies, and indeed into other jurisdictions outside of Canada. We are about to launch an associate membership program whereby, in a very structured and formal way, we would bring people to our planning table and have them give input into the COSIA planning process and focus where our efforts would go in the future, not just using our internal resources and ways of thinking but leveraging external perspectives and resources as well.

The Chair: Thank you, Mr. Calkins.

Mr. Leef, you have up to five minutes, please. Go ahead.

Mr. Ryan Leef (Yukon, CPC): Thank you, Mr. Chair.

To continue building on that, Mr. Wicklum, you're talking about the road map for innovation, the associate member program. Earlier in the presentation you talked about the charter that COSIA came out with. In your explorations outside Canadian jurisdictions, are there other jurisdictions in the world, in other countries, that are following this level of approach in terms of the depth and breadth of what you're doing? You're running through a pretty impressive list of a charter and road map and associate member programs and all these things to move forward on innovation. Do you know any other countries that are as intensely involved in this work?

● (1215)

Mr. Dan Wicklum: Oil sands are almost a unique resource. There are very few oil sands deposits around the world, so specifically applied to oil sands, this is a unique enterprise. Certainly other countries are terribly innovative and they've developed models that would fit their system.

In terms of the fundamental model of COSIA, which is a sharing and leveraging model by which large companies that have historically worked independently now will actually share their intellectual property, all towards advancing their environmental performance, to our knowledge this is a unique model in the world. We had the privilege of having a gentleman called Michael Porter, who is a Harvard professor and a globally recognized expert on business innovation, come to the oil sands and speak to us through a number of different fora. When we put the direct question to him, “Are you aware of a similar model and a similar level of effort?”, he was not aware of anything like COSIA in the world.

Mr. Ryan Leef: Can you repeat again how many members are part of COSIA?

Mr. Dan Wicklum: We have 14 of what we call shareholding companies. They are the founders, the producing companies that have signed a charter and are funding our infrastructure, but again we're in the middle of launching an associate membership program through which essentially any institution, organization, or individual who shares our vision of responsible development will have a way to plug in to the typical COSIA enterprise and activity so that we can harness their know-how and their ideas and bring them to bear on our issues.

Mr. Ryan Leef: In respect to innovation itself, do you categorically break down where innovation occurs? By that I mean when you look at some of the oil sands development or development generated across Canada, some of it's occurring in arctic to sub-arctic conditions. It's northern climate or cold climate innovation and those sorts of things, and other technologies would apply in a different region of Canada.

Do you break those down? Could you touch on some of the innovation that might be unique to cold climate innovation in Canada?

Mr. Dan Wicklum: There's certainly a high level of innovation and effort going on in the country from coast to coast. Our individual member companies have individual relationships with a whole suite of other providers, again coast to coast, from academic institutions to governments and so on.

One of the things we can do with COSIA, though, is focus and organize. There were a couple of pilot projects or essentially predecessor organizations that really test-drove the concept of sharing intellectual property. One was on tailings, for example. Interestingly, when they figuratively opened up their kimonos and shared the efforts they were making on different research projects, they found that even among the small number of mining companies, there was a high level of duplication. Inside COSIA what we can do is decrease that duplication and have individual companies take leads on projects, which is fine, because everyone gets to share the output.

One of the fundamental principles of innovation is to link and to lever into sectors that have historically not been linked and levered. Step change in innovation often comes with taking ideas from subsectors or areas or individuals who frankly know very little about certain subject matters.

That's what we will do, and we're very confident that the new developments that will come out of COSIA will have application globally, and not just in the petroleum sector outside of the oil sands but in other non-petroleum sectors, especially in such things as water recycling and water reuse, which the oil sands are so heavily into.

Mr. Ryan Leef: I have time for a short question. This one will be to Mr. Salkeld.

In your presentation you talked about $12.8 billion in innovation exports. What would be the most significant accounting of that dollar value?

Mr. Mark Salkeld: Right off the top, it would be labour and manufacturing. Lots of Canadian companies are providing skilled labour and supervisory knowledge, but it's also in manufacturing. We're manufacturing here and exporting. Then it would be manufacturing based on new technologies.

● (1220)

The Chair: Thank you very much, Mr. Leef.

We go now to Ms. Liu for up to five minutes.

Go ahead, please.

Ms. Laurin Liu (Rivière-des-Mille-Îles, NDP): Thanks to our witnesses.

I'd like to go first to Mr. Bleaney.

You mentioned the cuts to the SR and ED program. We've heard a lot from industry testifying at committee against these cuts; notably RIM came to the industry committee and also expressed concerns over these cuts.

We know the government has said they would take these and the money they would be saving from the SR and ED program and putting that into IRAP. What's your take on the allocation of funds?

Mr. Bob Bleaney: I'm not particularly familiar with the IRAP program, but I can generally observe that the work done that led up to these changes in the SR and ED treatment came largely from the Jenkins report and the government's review of that.

It turned out the Jenkins report really focused on small and medium-sized enterprises as the primary focus of that effort, and I think some of the changes they proposed were largely targeted at the SME area.

Our concern is that in our industry, the larger development projects we've been talking about today tend to be projects operated by larger corporate entities. In that situation the kinds of changes proposed from the SR and ED program are not as applicable to the broad-based pieces of pilot testing that need to be done, or I think the wording I would use is “pilot projects and deployment”.

Projects get developed on a continuum of innovation. They start with laboratory work that was discussed, and that evolves into further hypotheses being built about how we might be able to apply a technology. Then you take that new technology effort and you go out and pilot test it.

In our environment, these end up being very expensive programs, because you have to drill wells. A lot of this testing actually goes on in a relatively large scale. It's not done in a laboratory. It's done on the ground.

Ms. Laurin Liu: Thanks.

I want to go on to some questions for Mr. Weis from the Pembina Institute.

[*Translation*]

All of us followed the U.S. presidential elections a few weeks ago. The President is committed to invest 3% of the GDP in R and D, while in Canada, our investment represents, I think, 1.8% of our GDP.

The Pembina Institute carried out in 2009 a study titled

[*English*]

“United States to invest over six times more per capita in renewable energy and energy efficiency than Canada”.

[*Translation*]

Would you take us through the results of this study?

[*English*]

Dr. Tim Weis: I'm sorry. I missed the title of the study.

Ms. Laurin Liu: It was a study that came out in 2009 and was called “United States to invest over six times more per capita in renewable energy and energy efficiency than Canada”. There are some pretty interesting numbers in that report. I was wondering if you could touch on some of those.

Dr. Tim Weis: Sure. There were a couple of reports that were done. There was that one and I think one other one, either the year before or the year after—I can't remember—but they were ultimately comparing levels of investment in renewable energy and energy efficiency in Canada and the United States. I can't remember—it was a few years ago now that we did them—but compared to Canada at a federal level, for one year I think it was six times and for another year closer to 10 times the level of investment per capita in the United States around renewable energy and energy efficiency.

I think part of it speaks to the fact that we are seeing big growth right now in the United States in renewable energy and energy efficiency. I think there is some uncertainty around how long that growth is going to continue, but it really has become a much bigger market, not only on an absolute scale but also on a per capita scale, than what is going on in Canada right now.

Ms. Laurin Liu: Will you be tabling that report with the committee if you have a copy?

Dr. Tim Weis: Sure, I can. Yes.

Ms. Laurin Liu: That's great.

I know that you also studied at the University of Quebec at Rimouski. There you also studied the development of solar energy in remote communities. What would be the specific federal policies that we could put into place to encourage this industry in particular?

● (1225)

Dr. Tim Weis: Interestingly, one of the reasons I went to Rimouski was that at the time it was the only university in Canada that was offering research in wind energy at the Ph.D. level. That was only starting about eight years ago, so it shows that we have been a little bit behind when it comes to R and D in this area.

What we have proposed—and we have proposed it to the federal government several times—is a program specifically for remote communities that would incent this. We were looking specifically at wind, but I think the price of solar has come to the point now that you would be foolish not to include solar in that type of program. It would be modelled after NRCan's ecoENERGY for Renewable Power program, which was a very successful federal program encouraging renewable energy across Canada, but it would have something tailored to remote communities that is specific for their needs. This would mean that there is a capital component, which would help these small communities leverage financing, as well as a production incentive.

I would be more than happy to table for the committee the work we have done on that particular policy.

The Chair: Thank you, Ms. Liu.

We go now to Mr. Trost for up to five minutes, please.

Mr. Brad Trost (Saskatoon—Humboldt, CPC): Thank you, Mr. Chair, and thank you to our witnesses.

Years ago, when I was in one of my engineering classes, one of my professors talked about why certain changes had driven certain types of innovation for enhanced oil recovery to Canada versus to places in the United States. He talked about how in Alberta there was a centralized place where well-logging information and seismic information and things like that were gathered, whereas in California, where I believe he had done his doctorate, there was no centralized place for such information. That caused problems for smaller companies that wanted to be innovative, because they couldn't find everything they needed in one place.

The other thing I remember seeing a few years ago was a map that was fairly popular in parts of Saskatchewan, in certain circles in Saskatchewan. This map showed that oil development stopped in a straight line between Alberta and Saskatchewan. Now, that map no longer reflects current reality, owing to changes on both sides of the border, including royalty rate changes in Alberta and various other changes in Saskatchewan. Both of those stories illustrate an important point: that political and jurisdictional decisions affect innovation and development.

My question is to CAPP and to PSAC.

I know industries call for subsidies and so forth in the energy industry. By and large, you guys don't. What steps could the government take or what impediments could we withdraw that hold up innovation? Can we do simple things such as the Social Credit did way back, when they made sure that information was accessible in Alberta for junior oil companies to go in, look through the data, and then redrill? What can we do or what can we take away to assist in fostering innovation in industry development?

We'll start here, and then we'll go to our friends on teleconference.

The Chair: Go ahead, Mr. Bleaney.

Mr. Bob Bleaney: Thank you, Mr. Trost, and Chair.

I would like to follow on with the answer I provided to Ms. Liu earlier that relates to your question: larger-scale test grounds or pilot project work needs to be done to move some of these ideas forward to a commercial stage. That's always the difficult part of the innovation curve—taking laboratory ideas through to commercial projects.

That work was supported by the SR and ED program to a greater degree than it will be going forward, and I think we should continue to look at means or policies to help support that more risky but very important stage of the innovation curve.

On other matters, I might suggest passing this question on to Mr. Stringham, because he can help fill in on that, I think.

The Chair: Go ahead, Mr. Stringham.

● (1230)

Mr. Greg Stringham: Thank you. Yes, Mr. Trost, I think there are a couple of exemplars of really good practice that need to be enhanced.

As you mentioned, transparency is really key for us. As an industry, we've been standing on this foundation of making sure that we have transparent information available. One of the two examples of that is the core labs. As you mentioned, throughout western Canada, whenever drilling takes place, a core sample is taken and then made publicly available for everyone around, both governments and industry, to be able to use and identify. That really has led to innovation, even with the latest horizontal drilling and hydraulic fracturing for tight oil. All that core has been there for people to go and take a look at and understand at the surface, rather than going out and redrilling every time. That transparency has been really key.

A second example, though, is the oil sands environmental monitoring that the governments are moving ahead with right now. Cooperation between the federal and provincial governments is needed to get that program in place, but then we need to be sure the data coming out of all that monitoring going on right now is readily transparent so that it can be looked at not only by industry but also by governments and the public. We have a good example of that on air quality in Alberta, where it is on the Internet 24 hours a day, seven days a week. We just need to broaden it now with this new program in place to make sure that the transparency is there.

The last one I would suggest is this idea of a technology fund. In Alberta, under the current climate change regulations, a technology fund is collected from the revenues that are part of a carbon levy in place. That technology fund is then rededicated out to solving the root cause of GHG emissions, not just for our industry but for other industries, and in renewables and everything else. That really has been a very valuable aspect of the regulation in place.

The Chair: Thank you, Mr. Trost.

We go now to Mr. Gravelle for up to five minutes, please. Go ahead.

Mr. Claude Gravelle (Nickel Belt, NDP): Thank you, Mr. Chair, and my questions are going to be for Dr. Weis and Mr. Cameron. I'd like to start with Mr. Weis, and keep in mind that I only have five minutes. I'd like to give Mr. Cameron a chance to answer the question also.

Some people around Ottawa think there's only one choice between the economy and the environment. We happen to think we can do both. Do you see the economy and the environment as winners for Canadians now and in the future, with investments in clean energy, renewables, and efficiency?

Dr. Weis, would you comment?

Dr. Tim Weis: Obviously the two are inextricable. You can't take them apart. They're part of the same equation. I also think the question that Canada needs to ask itself.... We've won the energy lottery at the end of the day, particularly as a country. We have so many resources. I think the question is, what is our long-term plan with those resources and what are we doing with them strategically? What's the long-term investment that we're making as a result of extracting these conventional resources? I think that's fundamentally the question that we need to start wrestling with in short order. How do we leverage the endowment we have in fossil fuels and other resources to create a long-term renewable economy?

Mr. Claude Gravelle: Would you comment, Mr. Cameron?

Mr. James Cameron: It seems to me that a good government combines the two without making too much of a fuss of what label to put on their policies, so if you build infrastructure that lasts, that is resilient, that could withstand the risks associated with a natural disaster or that can cope with the sea level rising in coastal cities, you don't need to call that environmental policy. That's just an intelligent way to build infrastructure, knowing the evidence you have about the risks associated with elevated climate change.

Other natural resource issues are associated with access to water. For example, if you build infrastructure that allows you to get good access to water, you can call that an environmental investment or you can call it a sound economic investment. It doesn't really matter. We spend far too much time trading off these two imperatives. Good government always combines the two. It's hard and it takes a particular quality of leadership to cope with complex problems that can't be resolved very quickly.

One of the other things I'm sure about is that if you can build good investments around future infrastructure, you will encourage innovation around the kind of problem-solving that produces value-added businesses in your economy. That makes sense for a resource-rich economy as well as one that's resource poor. Making more from less is a good strategy for any economy, and it requires significant investment and new ways of doing business. That's largely where value is created. I really think a clear combination of the two defines the quality of leadership in business and government.

● (1235)

Mr. Claude Gravelle: Dr. Weis, of the 12 major industrialized countries, Canada is ranked second-last as far as energy efficiency is concerned. Can you comment on Canada's performance? Why is it so low, and what we can do to improve it?

Dr. Tim Weis: When it comes to efficiency, that is definitely one area that we seem to be lagging in. Part of that I think has to do with the fact that we have fairly cheap and abundant energy here and we don't use it perhaps as carefully as we need to.

I think there are key things we could be doing to improve on that, many of which fall within federal jurisdiction. Obviously regulations within Natural Resources Canada regulate efficiency standards. I think that's important work that the federal government has led on and can continue to do better.

Obviously pricing carbon again is going to be an important area if we want to be driving more careful use of these resources, but I think that at the end of the day, it also comes down to a cultural shift: we need to be talking about this more, talking more about energy not being something to be wasted. It is a precious resource, and we need to be more careful how we extract and consume it.

The Chair: Thank you, Mr. Gravelle.

We go now to Ms. Grewal for up to five minutes.

Welcome to our committee. Go ahead, please.

Mrs. Nina Grewal (Fleetwood—Port Kells, CPC): Thank you, Mr. Chair, and thank you very much to the witnesses.

Mr. Chair, thank you for giving me the opportunity to participate here, since I'm not a regular member on this committee. It's a pleasure to be here.

I have a long question. My question goes to Mr. Weis.

The Canadian Association of Petroleum Producers has stated that the oil and gas industry is the biggest investor in research and development into better ways of protecting the environment, and particularly that the industry is also devoting significant resources to carbon capture and storage as well as to reducing the amount of water used in extracting and processing.

First, given the significant resources that have been put into research and development, are there any kinds of innovative, made-in-Canada technologies that have been sold to international markets?

Mr. Weis, you also mentioned that reverse engineering of Canadian technology has occurred in Australia. I'm wondering whether there are more examples of that.

There was also a comment made by Mr. Salkeld. I think what he said was that there is $12.6 billion in export-related services. How is that related to innovation? Second, can you comment on the impact that these investments have had on employment within the innovation segment of the industry?

The Chair: Ms. Grewal, were all of those questions for Mr. Weis, or just the first two?

Mrs. Nina Grewal: The first portion goes to Mr. Weis, and there was a small little question to Mr. Salkeld.

The Chair: Very good.

Mr. Weis, go ahead, please, with the answers to the first two questions.

Dr. Tim Weis: I'm not sure I can fairly answer the first question. I think CAPP might be in a better position to comment on some of the technologies that might have been exported. I want to say that important gains have been made, including in oil sands development, but as well in conventional oil and gas development, particularly on the energy efficiency side of things. We sometimes overlook those things and we need to give credit where credit is due.

One key area in which there has been some investment from oil and gas development but that I think we probably could push further forward is geothermal energy development. We're very good at drilling in Canada. This is an area using expertise that we've highly developed, particularly in western Canada. It's an important technology that is going to be an important part of the renewable energy mix going forward and it could be an area for Canada to be a leader in, and an innovator. Some of the early investments we've seen from the oil and gas industry with respect to geothermal have started along that path, but we really haven't seen major, successful geothermal projects yet, and I think that's an area we could be focusing on.

Perhaps I can defer to CAPP to comment on the question about technology that has been developed in Canada and ultimately exported.

● (1240)

The Chair: Thank you, Mr. Weis.

I think we'll go first to Mr. Salkeld, and then if there is time we'll go to CAPP for further response to that.

Go ahead, please, Mr. Salkeld.

Mr. Mark Salkeld: Thank you very much.

To respond to your question with respect to $12.8 billion being generated in revenue, based on Canadian companies, Canada has a unique environment in which there is a high level of collaboration between the producers, the CAPP member companies and PSAC member companies. This collaboration, as well as the formations we work in and the use of our resources, gives them a good opportunity to develop leading-edge technologies, which are sought after.

There isn't an oil patch in the world in which you won't find a Canadian worker who is travelling back and forth and learning from Canadian technologies as well as learning from these other oil fields, and then coming back here and experimenting and testing, as I said. Then we develop it, and then we export it.

It's not just the directional drilling equipment itself or our use of saline waters in our production processes, but it's these kinds of technologies that we can export and that are sought after. It's Canadians who are going along with that technology who are teaching it.

I've travelled around the world; I've worked in a number of oil fields. Canadians are highly respected around the world for their knowledge and safety. This all comes back to us in questions and foreign investment with respect to what we can deliver.

It's just a unique environment: the formations, a high level of collaboration, and how we manage our resources in the course of our jobs.

The Chair: Thank you for your responses, and thank you, Ms. Grewal, for your questions.

Now, we have Mr. Bevington. You have up to five minutes, please.

Mr. Dennis Bevington (Western Arctic, NDP): Thank you, Mr. Chair.

I want to touch briefly with Mr. Weis on the question of those 300 communities in northern Canada.

Would you say that it's safe to say of those 300 communities—many of which are aboriginal communities on reserves, many within the three northern territories—that a very high percentage of the cost of operation of those communities is addressed through transfers from the federal government?

I'm trying to make a point here that there's a net benefit gain to the federal government in improving the energy efficiency of those communities.

The Chair: Mr. Weis, go ahead.

Dr. Tim Weis: Absolutely. Particularly the cost of diesel fuel ultimately is in federal dollars, and as the member eloquently put it about improving efficiency, this is obviously another important area in these communities.

However, on the renewable energy side as well, the policy that we've put forward would, we think, ultimately save the federal government about twice as much as it would cost, because it's ultimately the aboriginal and northern affairs department that ends up being responsible for the diesel costs. At the end of the day I think it's a win-win situation, and in some ways it's frustrating that we haven't moved faster in this area.

Mr. Dennis Bevington: Now I'm just going to move to—

Actually, I hope Mr. Bleaney can answer some of these questions, because I was very interested in the upstream work that's being done on energy efficiency; it was a fabulous presentation.

However, I'm really interested in upgraders. What percentage of the greenhouse gas emissions in the average barrel of synthetic oil comes from the upgrading process?

Mr. Bob Bleaney: I'm afraid I'm not up on the specifics of that particular background, so again I wonder whether Mr.—

Mr. Dennis Bevington: Could you give that information to the committee, then?

Mr. Bob Bleaney: I was just going to ask whether Mr. Stringham might be aware of it.

The Chair: Mr. Stringham, can you answer that question?

Mr. Greg Stringham: It depends on the source of the upgrading technology, but we certainly can pull out for you the scientific studies that have been done most recently by Jacobs Consultancy, which have that information.

● (1245)

Mr. Dennis Bevington: Can you give us just an idea?

Mr. Greg Stringham: Of the greenhouse gas emissions for the full wells-to-wheels, as you know, about 70% to 80% actually comes out of the tailpipe of the vehicle that is driving it. Of the remaining 20% to 30%—

Mr. Dennis Bevington: But on the production side....?

Mr. Greg Stringham: On the production side, the remaining 20% to 30% depends on the nature of the upgrader. If it's integrated with a refinery, then actually there's no loss in reheating of the fuel, so it's a smaller percentage, but I don't have the exact number for you. I would guess it's probably about a third, but that's just a guess. I can get you the scientific information.

Mr. Dennis Bevington: Are the companies moving more towards hydrogen addition or to coking these days in the upgrading?

Mr. Greg Stringham: In Canada right now, we upgrade about 60% of the bitumen into light oil. In that 60% right now, just about half and half are using a combination of both coking on one side and hydrogen addition on the other side. In fact, some facilities use both. Remember, the hydrogen addition takes the hydrogen out of the natural gas and has some CO_2 impacts as well.

Mr. Dennis Bevington: Do you think that our technology in Canada for upgrading is better than the technology existing on the Gulf Coast of Texas in those upgraders that were used for Venezuelan heavy oil?

Mr. Greg Stringham: The technology that's being used is pretty well generally used around the world and is very similar. There have been modifications to deal with what's going on with the direct oil sands feed, but the technologies themselves are quite similar. It depends upon when they were built. As you know, the newer the technology, the newer the information that's put into it, and it's the higher quality of technology that advances over time.

Mr. Dennis Bevington: I can see this in the case of the machinery. Isn't it also a result of the different kinds of bitumen or heavy oil that needs to be upgraded? Are these plants capable of handling these different streams without change?

I'm trying to find out whether there are efficiency improvements that can be made to upgrading as well in Canada so that we can be more competitive in expanding that industry. The upgrading has been losing ground in Canada over the last five years.

Mr. Greg Stringham: As we look at the opportunities for adding additional upgrading capacity, there are several of them that are planned, as you know. The North West upgrader is one. It was just announced in the last couple of weeks that it is moving ahead, and there are also expansions to existing facilities on the production side that have upgraders associated with them.

It is moving ahead, then, but it requires the synergy that we have seen happen down on the Gulf Coast. The efficiency here, I would say, is a combination of that upgrader with the upstream segment so that steam and electricity can be shared across or with the downstream refining segment, as we have in Fort Saskatchewan, or with the North West upgrader, whereby you can combine an upgrader with a refinery and then you're sharing the heat. You're not having the heat losses. You're sharing the utilities, and that's really where the efficiency gains can allow us to be competitive.

The Chair: Thank you, Mr. Bevington.

We will go now to Mr. Anderson, followed by Mr. Allen.

Go ahead, Mr. Anderson.

Mr. David Anderson (Cypress Hills—Grasslands, CPC): I think we'll share.

Gentlemen, this is for CAPP and PSAC, I guess. I'd like someone to address this.

We haven't talked much today about hydraulic fracking. There is a lot of concern out there.There seems to be a lot of misinformation intended to scare people about it. I wonder if you can tell us first of all if it is safe, and then give us a little bit of history. Where does it come from? Where it is today, and where do you see it going in the future?

This information is going into a report that we'll make, so I'm interested in your perspective on that.

Mr. Wally Kozak: Number one, it is safe. Our company has been doing it for 12 years. The technology itself has been around for 60-plus years. It's immediate post-war technology. It's older than television.

We can argue this until the cows come home. I'm sure other people have different perspectives, but there is still, to date, in North America no proven case of hydraulic fracturing having gone up through fractures and contaminated ground water. Yes, as an industry, we recognize that there have been incidents in which fluids have gone up as a result of poor well integrity and caused damage. That is an area of focus for our sector.

Where we're going in the next five years is a very difficult question. We are looking at incremental improvements in dozens of ways in our inputs, whether those be through chemistry, base fluids, equipment, or supplies such as proppants. They are being hauled tremendous distances, so we're looking at improving our local sourcing of that material.

What else can I add to that?

Operationally we are looking at productivity gains from reconfiguring equipment to improve ergonomics. As development gets more frequent and intense, we are looking to get efficiencies in our labour and labour logistics.

Finally, on treatment design, we are looking at new fluids, more benign fluids, and at trying to improve the fluid effectiveness to try to achieve more with less.

Does that answer your question?

● (1250)

Mr. David Anderson: Sure. How soon will implementation be for some of those changes that you seem to be optimistic about?

I'm just wondering if anyone else has a response to the question as well.

Mr. Wally Kozak: The things I'm talking about are either in progress and in evaluation right now or are within the realm of testing within the next five years.

Mr. David Anderson: Would it be safe to say the discussion is more about political issues than it is about scientific ones, and that you believe the science is safe and that your technology is safe?

Mr. Wally Kozak: I agree. The science and technology are safe.

Mr. David Anderson: An earlier comment was made that basically you can walk through an oil field from 3,000 meters above. I'm just wondering if you can give a little explanation of how that works. What is the computer technology, the data analysis, data management that goes into that? We'd be interested in hearing a little bit about that.

Mr. Mark Bentsen (President and Chief Executive Officer, Cathedral Energy Services Ltd., Petroleum Services Association of Canada): On some of the technology, you have to realize we are starting above ground and trying to put a wellbore in place in a spatial situation that is desired by the oil and gas company. We start with an initial surface survey. We have a bottomhole survey as well. We do some engineering around exactly the placement of that wellbore. We then use a guidance system called a measurements-while-drilling system, which essentially tells us various parameters as we drill the wellbore, and as we drill that down, we're computer-simulating exactly where we are in a 3-D formation.

We also receive different levels of information from that particular tool. It gives us various logging spots. As we drill down, we're trying to match the formations that were designed and picked out through seismic. We're matching those exactly to what we're actually seeing as we drill down.

With regard to the tools we have, we're starting to develop things that have significant computing horsepower so we can try to determine exactly what the bit is doing and where it's heading, so as we drill that wellbore down, we end up landing in the horizon they are looking at. Then we take the logging data we are picking up through real-time information and steer the wellbore across the formation in the desired path and in through the most economic part of the reservoir that we can get into.

Mr. David Anderson: Mr. Calkins has a question about the mud pulse. He was wondering if that technology has evolved as well.

Mr. Mark Bentsen: Well, there are two different technologies used for the MWD system. One is mud pulse and the other is electromagnetic. The mud pulse has been around for a significantly longer period of time.

As a company, we have moved toward electromagnetic, sending it up as a radio wave rather than through the fluid system. That is essentially much more efficient in getting that information to surface. We're able to send probably ten times the data at ten times the data rate. As we start to bring more technology onto the tool, there's only so much data that we can send over a time period that provides the accuracy, so the technology that we have developed, the electro-magnetic, is the most efficient method of bringing that information back to surface. That's one of the innovations we've been able to bring forward.

The Chair: Thank you.

Mr. David Anderson: Can I have a second, Mr. Chair?

The Chair: Okay, Mr. Anderson. You'll take a little bit of Mr. Allen's time.

Mr. David Anderson: I'll ask one more question and then Mike can take over.

I'll change the topic quite a bit here. We've talked a lot about labour shortages across this country. I'm wondering if you're doing anything in terms of employment innovation and education employment in your industry. Just today, in a report on energy development in the north, we heard a lot about the challenges of acquiring workers in the local area and some things that need to be done differently in terms of education. Can you tell us what your industry is doing in terms of educational innovation and employment innovation?

● (1255)

Mr. Mark Salkeld: From a PSAC perspective we actually have a number of significant areas with regard to labour development within Canada, working closely with institutions, but we've also been in discussions with the federal government.

I have a senior vice-president who heads up our human resource committee, which is well attended by a significant number of PSAC member companies. We're talking about identifying skilled labour within Canada, skilled labour that's already established and that we can identify across Canada and map to needs in western Canada in the oil and gas services sector. We've published those reports through the Petroleum Human Resources Council of Canada as well as with the University of Alberta.

We're also identifying six significant skilled labour shortages with respect to trades. We're working with institutions, as well as with the federal government on the immigration side, to identify skilled labour and trades equivalencies around the world where necessary, but across Canada first and foremost. As well, we are working with first nations, developing programs with groups to introduce folks into trades there.

Those are two or three off the top of my head, but I'd be more than pleased to forward a more detailed report of what we're doing with respect to labour in this area. We have a very good relationship with the educational institutes, with SAIT and NAIT in western Canada, as well as three others across western Canada, in B.C. and Saskatchewan, as well as the university. A lot of effort on the part of the oil and gas industry as a whole is going on, including CAPP members in the other areas, to develop skilled labour within Canada, without a doubt.

The Chair: Thank you for offering to send that report. We'll look forward to it.

Mr. Allen, you have two and a half minutes.

Mr. Mike Allen: Thank you very much.

With respect to the growth in shale gas around the world, the U.S., China, and other places, would you consider that our technology and innovation are on par or ahead? Do you see that as an opportunity for us to export more technologies?

That's to the Petroleum Services Association of Canada.

Mr. Mark Salkeld: I sincerely apologize. Could you—

A voice: He was asking about the opportunities to export technologies for shale gas around the world.

Mr. Mark Salkeld: You know what, I've got it.

There's one thing I want to really try to clarify here. Everybody talks about shale gas. Actually, it's always all natural gas, but we find it in different formations, one of them being shale. From surveys that we've developed over the years, we realize that people really don't understand the difference. It's all natural gas; it simply comes from different formations.

That said, the technologies that we've developed, essentially for 60 or 70 years, have clearly identified significant pools of resources. The Pembina, the Cardium, and the Viking have all been well established.

The technology we've developed here in Canada is taking us below ground, beyond those conventional pools, and into the outer reaches of those same formations, and it's allowing us to steer into them with a directional drilling piece in combination with the hydraulic fracturing. These types of formations are found in vast quantities, not only in Canada but in China and in Russia, obviously, and different parts of the world.

There again, to go back to the high levels of collaboration between the services sector and the producing sector, we have a unique environment where I honestly believe we are leaders in this area. That's what's generating a lot of interest by foreign investors and other countries, because they have these resources under their feet and we've developed a technology to get at them safely and efficiently. That opens those doors for export potential for Canadian skills, labour, manufacturing, and product development.

Mr. Mike Allen: Thank you.

The Chair: Thank you very much, Mr. Allen.

Thank you all for your great questions.

Go ahead, Mr. Julian.

Mr. Peter Julian: I know there is only a minute left and it's our turn. I did inform the clerk I want to take that minute.

The Chair: Mr. Julian, I've got to have the meeting close on time today.

I just want to thank the witnesses for their presentations today. Here in person, from the Canadian Association of Petroleum Producers, we had Mr. Bleaney. Thank you very much.

By video conference from Calgary, Alberta, from the Canadian Association of Petroleum Producers, we had Greg Stringham, vice-president, oil sands and markets. Thank you.

We had Dan Wicklum, chief executive, Canada's Oil Sands Innovation Alliance. Thank you.

From the Petroleum Services Association of Canada we had Mark Salkeld, president and chief executive officer. Thank you.

We had Wally Kozak, engineer chief, global services, Calfrac Well Services Ltd. Thank you.

As well, we thank Mark Bentsen, president and chief executive officer, Cathedral Energy Services Ltd.

By video conference from Edmonton we had, from the Pembina Institute,Tim Weis, director, renewable energy and efficiency policy. Thank you.

We had, via video conference, of course, from London, the United Kingdom, Mr. James Cameron, chairman of Climate Change Capital. Thank you.

Thank you to all the witnesses and to committee members for what I think is a great start to our study.

We'll see you again on Thursday for more of the study. Thank you.

The meeting is adjourned.

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